

What is claimed is:

1. A method for processing image data outputted from an image-capturing apparatus, said method comprising the steps of:

converting a color space, provided for said image data, to a scene-referred color space by excluding color characteristics, being inherent to said image-capturing apparatus, from said color space;

converting a gradation, provided for said image data, to a scene-referred gradation by excluding gradation characteristics, being inherent to said image-capturing apparatus, from said gradation, based on model gradation characteristic information representing said gradation characteristics inherent to said image-capturing apparatus; and

optimizing processed image data, provided with said scene-referred color space and said scene-referred gradation so as to generate output-referred image data, which are optimized for reproducing an image on a specific outputting medium.

2. The method of claim 1,

wherein said color space is converted to said scene-referred color space by excluding said color characteristics from said color space, based on model color characteristic information representing said color characteristics inherent to said image-capturing apparatus.

3. The method of claim 2,

wherein said model color characteristic information are acquired from said image data.

4. The method of claim 1,

wherein said color space is converted to said scene-referred color space by excluding chroma differences, inherently existing between various types of image-capturing apparatus.

5. The method of claim 1,

wherein said scene-referred color space is a standardized color space established in advance.

6. The method of claim 1,

wherein said model gradation characteristic information are acquired from said image data.

7. The method of claim 1, further comprising the steps of:

applying an exposure control processing and a gray-balance adjustment processing to said processed image data so as to correct a color deviation and to adjust a brightness of said image to be reproduced; and

applying a gradation correction processing to said processed image data after said step of applying said exposure control processing and said gray-balance adjustment processing, so as to adjust gradation of said image to be reproduced.

8. The method of claim 7,

wherein, in said step of applying a gradation correction processing, said gradation provided for said processed image data is nonlinearly compensated for.

9. An apparatus for processing image data outputted from an image-capturing apparatus, said apparatus comprising:

a storage to store a plurality of model gradation characteristic information sets each of which represents gradation characteristics inherent to each of a plurality of image-capturing apparatus;

a retrieving section to retrieve a model gradation characteristic information set, corresponding to an image-capturing apparatus designated by an operator, from said plurality of model gradation characteristic information sets;

a gradation converting section to convert a gradation, provided for said image data, to a scene-referred gradation by excluding gradation characteristics, being inherent to said image-capturing apparatus, from said gradation, based on said model gradation characteristic information set retrieved by said retrieving section;

a color characteristic converting section to convert a color space, provided for said image data, to a scene-referred color space by excluding color characteristics, being inherent to said image-capturing apparatus, from said color space; and

a controlling section to control a concerned section included in said apparatus so as to optimize processed image data, provided with said scene-referred gradation and said scene-referred color space, to generate outputted-referred image data, which are optimized for reproducing an image on a specific outputting medium.

10. The apparatus of claim 9,

wherein said storage also stores a plurality of model color characteristic information sets each of which represents color characteristics inherent to each of said plurality of image-capturing apparatus and said retrieving section retrieves a model color characteristic information set, corresponding to said image-capturing apparatus designated by said operator, from said plurality of model color characteristic information sets stored in said storage; and

wherein said color characteristic converting section converts said color space, provided for said image data, to said scene-referred color space by excluding said color characteristics from said color space, based on said model gradation characteristic information set retrieved by said retrieving section.

11. The apparatus of claim 10,

wherein said retrieving section acquires said model color characteristic information set from said image data.

12. The apparatus of claim 9,

wherein said color characteristic converting section converts said color space to said scene-referred color space

by excluding chroma differences, inherently existing between various types of image-capturing apparatus.

13. The apparatus of claim 9,

wherein said scene-referred color space is a standardized color space established in advance.

14. The apparatus of claim 9,

wherein said retrieving section acquires said model gradation characteristic information set from said image data.

15. The apparatus of claim 9,

wherein said controlling section applies an exposure control processing and a gray-balance adjustment processing to said processed image data so as to correct a color deviation and to adjust a brightness of said image to be reproduced, and then, applies a gradation correction processing to said processed image data, so as to adjust gradation of said image to be reproduced.

16. The apparatus of claim 15,

wherein said controlling section nonlinearly compensated for said gradation provided for said processed image data when applying said gradation correction processing to said processed image data.

17. An apparatus for reproducing an image on a specific outputting medium, based on image data outputted from an image-capturing apparatus, said apparatus comprising:

- a storage to store a plurality of model gradation characteristic information sets each of which represents gradation characteristics inherent to each of a plurality of image-capturing apparatus;

- a retrieving section to retrieve a model gradation characteristic information set, corresponding to an image-capturing apparatus designated by an operator, from said plurality of model gradation characteristic information sets;

- a gradation converting section to convert a gradation, provided for said image data, to a scene-referred gradation by excluding gradation characteristics, being inherent to said image-capturing apparatus, from said gradation, based on said model gradation characteristic information set retrieved by said retrieving section;

a color characteristic converting section to convert a color space, provided for said image data, to a scene-referred color space by excluding color characteristics, being inherent to said image-capturing apparatus, from said color space; and

a controlling section to control a concerned section included in said apparatus so as to optimize processed image data, provided with said scene-referred gradation and said scene-referred color space, to generate outputted-referred image data, which are optimized for reproducing said image on said specific outputting medium.

18. The apparatus of claim 17,

wherein said storage also stores a plurality of model color characteristic information sets each of which represents color characteristics inherent to each of said plurality of image-capturing apparatus and said retrieving section retrieves a model color characteristic information set, corresponding to said image-capturing apparatus designated by said operator, from said plurality of model color characteristic information sets stored in said storage; and



wherein said color characteristic converting section converts said color space, provided for said image data, to said scene-referred color space by excluding said color characteristics from said color space, based on said model gradation characteristic information set retrieved by said retrieving section.

19. The apparatus of claim 18,

wherein said retrieving section acquires said model color characteristic information set from said image data.

20. The apparatus of claim 17,

wherein said color characteristic converting section converts said color space to said scene-referred color space by excluding chroma differences, inherently existing between various types of image-capturing apparatus.

21. The apparatus of claim 17,

wherein said scene-referred color space is a standardized color space established in advance.

22. The apparatus of claim 17,

wherein said retrieving section acquires said model gradation characteristic information set from said image data.

23. The apparatus of claim 17,

wherein said controlling section applies an exposure control processing and a gray-balance adjustment processing to said processed image data so as to correct a color deviation and to adjust a brightness of said image to be reproduced, and then, applies a gradation correction processing to said processed image data, so as to adjust gradation of said image to be reproduced.

24. The apparatus of claim 23,

wherein said controlling section nonlinearly compensated for said gradation provided for said processed image data when applying said gradation correction processing to said processed image data.

25. A computer program for executing image-processing steps, which are applied to image data outputted from an image-capturing apparatus so as to reproduce an image on a specific

outputting medium, said computer program comprising the functional steps of:

retrieving a model gradation characteristic information set, corresponding to an image-capturing apparatus designated by an operator, from a plurality of model gradation characteristic information sets stored in advance;

converting a gradation, provided for said image data, to a scene-referred gradation by excluding gradation characteristics, being inherent to said image-capturing apparatus, from said gradation, based on said model gradation characteristic information set retrieved in said retrieving step;

converting a color space, provided for said image data, to a scene-referred color space by excluding color characteristics, being inherent to said image-capturing apparatus, from said color space; and

optimizing processed image data, provided with said scene-referred gradation and said scene-referred color space, to generate outputted-referred image data, which are optimized for reproducing said image on said specific outputting medium.

26. The computer program of claim 25,

wherein, in said retrieving step, a model color characteristic information set, corresponding to said image-capturing apparatus designated by said operator, is also retrieved from a plurality of model color characteristic information sets stored in advance; and

wherein, in said second converting step, said color space, provided for said image data, is converted to said scene-referred color space by excluding said color characteristics from said color space, based on said model gradation characteristic information set retrieved in said retrieving step.

27. The computer program of claim 26,

wherein said model color characteristic information set is acquired from said image data.

28. The computer program of claim 25,

wherein, in said second converting step, said color space is converted to said scene-referred color space by excluding chroma differences, inherently existing between various types of image-capturing apparatus.

29. The computer program of claim 25,

wherein said scene-referred color space is a standardized color space established in advance.

30. The computer program of claim 25,

wherein said model gradation characteristic information set is acquired from said image data.

31. The computer program of claim 25,

wherein, in said optimizing step, an exposure control processing and a gray-balance adjustment processing are applied to said processed image data so as to correct a color deviation and to adjust a brightness of said image to be reproduced, and then, applies a gradation correction processing to said processed image data, so as to adjust gradation of said image to be reproduced.

32. The computer program of claim 31,

wherein, in said optimizing step, said gradation provided for said processed image data is nonlinearly compensated for when applying said gradation correction processing to said processed image data.

33. A storage medium that stores a computer program for executing image-processing steps, which are applied to image data outputted from an image-capturing apparatus so as to reproduce an image on a specific outputting medium,

wherein said computer program comprises the functional steps of:

retrieving a model gradation characteristic information set, corresponding to an image-capturing apparatus designated by an operator, from a plurality of model gradation characteristic information sets stored in advance;

converting a gradation, provided for said image data, to a scene-referred gradation by excluding gradation characteristics, being inherent to said image-capturing apparatus, from said gradation, based on said model gradation characteristic information set retrieved in said retrieving step;

converting a color space, provided for said image data, to a scene-referred color space by excluding color characteristics, being inherent to said image-capturing apparatus, from said color space; and

optimizing processed image data, provided with said scene-referred gradation and said scene-referred color

space, to generate outputted-referred image data, which are optimized for reproducing said image on said specific outputting medium.

34. The storage medium of claim 33,

wherein, in said retrieving step, a model color characteristic information set, corresponding to said image-capturing apparatus designated by said operator, is also retrieved from a plurality of model color characteristic information sets stored in advance; and

wherein, in said second converting step, said color space, provided for said image data, is converted to said scene-referred color space by excluding said color characteristics from said color space, based on said model gradation characteristic information set retrieved in said retrieving step.

35. The storage medium of claim 34,

wherein said model color characteristic information set is acquired from said image data.

36. The storage medium of claim 33,

wherein, in said second converting step, said color space is converted to said scene-referred color space by excluding chroma differences, inherently existing between various types of image-capturing apparatus.

37. The storage medium of claim 33,

wherein said scene-referred color space is a standardized color space established in advance.

38. The storage medium of claim 33,

wherein said model gradation characteristic information set is acquired from said image data.

39. The storage medium of claim 33,

wherein, in said optimizing step, an exposure control processing and a gray-balance adjustment processing are applied to said processed image data so as to correct a color deviation and to adjust a brightness of said image to be reproduced, and then, applies a gradation correction processing to said processed image data, so as to adjust gradation of said image to be reproduced.

40. The storage medium of claim 39,



wherein, in said optimizing step, said gradation provided for said processed image data is nonlinearly compensated for when applying said gradation correction processing to said processed image data.